

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
SUPERVISOR OF WELLS

THE PETITION OF MARATHON OIL COMPANY

CAUSE NO. (A) 1-1-90

TEMPORARY PRORATION ORDER

Testimony provided by expert witnesses has shown that gas is being over-produced within the proposed unit area. This fact was not disputed by any witness or party. Therefore, I find it necessary in order to prevent waste and to preserve reservoir energy, that gas allowables be reduced within the proposed unit area.

The Supervisor of Wells has determined that a temporary proration order is necessary for oil and gas production from all formations from the surface to a depth one hundred (100) feet below the top of the Prairie du Chien Group within the area proposed for unitization, which is described as:

W $\frac{1}{2}$ of NE $\frac{1}{4}$, SE $\frac{1}{4}$ of NW $\frac{1}{4}$, NE $\frac{1}{4}$ of SW $\frac{1}{4}$, and SE $\frac{1}{4}$ of Section 30;
NE $\frac{1}{4}$, NW $\frac{1}{4}$ of SE $\frac{1}{4}$, and E $\frac{1}{2}$ of SE $\frac{1}{4}$ of Section 31; SW $\frac{1}{4}$ of NW $\frac{1}{4}$,
W $\frac{1}{2}$ of SW $\frac{1}{4}$, and SE $\frac{1}{4}$ of SW $\frac{1}{4}$ of Section 32, in T4S, R2W,
Hanover Township, Jackson County, Michigan and SE $\frac{1}{4}$ of NW $\frac{1}{4}$,
W $\frac{1}{2}$ of NW $\frac{1}{4}$, SW $\frac{1}{4}$, and SW $\frac{1}{4}$ of SE $\frac{1}{4}$ of Section 5; E $\frac{1}{2}$ of NE $\frac{1}{4}$ of
Section 6; E $\frac{1}{2}$ of NW $\frac{1}{4}$, W $\frac{1}{2}$ of NE $\frac{1}{4}$, SE $\frac{1}{4}$ of NE $\frac{1}{4}$, and SE $\frac{1}{4}$ of
Section 8; N $\frac{1}{2}$ of NW $\frac{1}{4}$ of Section 16; and N $\frac{1}{2}$ of NE $\frac{1}{4}$ of
Section 17, in T5S, R2W, Moscow Township, Hillsdale County,
Michigan.

The daily production allowable for each well producing from the defined formations, within the described area, shall be 150 BOPD and/or 125 Mcf gas per day.

This Order becomes effective at 7:00 a.m. Eastern Daylight Saving Time April 9, 1990 and shall continue in effect until such time that the Supervisor of Wells issues a Final Order or Supplemental Order in this matter. Additional actions may be taken as necessary to prevent waste from the effective date of this Order through the conclusion of this cause.

Dated: 4/6/90


R. THOMAS SEGALL
ASSISTANT SUPERVISOR OF WELLS

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

ORDER OF THE SUPERVISOR OF WELLS

IN THE MATTER OF:

THE PETITION OF MARATHON OIL)
COMPANY FOR UNITIZATION OF)
PART OF THE STONEY POINT FIELD)
IN PARTS OF HANOVER TOWNSHIP,)
JACKSON COUNTY AND PARTS OF)
MOSCOW TOWNSHIP, HILLSDALE)
COUNTY AND ABROGATION OF)
SPACING AND PRORATION WITHIN)
THE UNIT AREA)

SUPPLEMENTAL ORDER NO. (A) 1-1-90

SUPPLEMENTAL OPINION AND ORDER

On November 15, 1989, Marathon Oil Company (Marathon) filed its Verified Petition requesting that the Assistant Supervisor of Wells (Supervisor) form the North Stoney Point Unit (NSPU) pursuant to 1959 PA 197. Marathon's Petition requested that the Supervisor enter an Initial Order providing for unitized operations, and requested the scheduling of a supplemental hearing to determine whether the approvals required by 1959 PA 197, Section 7 have been obtained.

Following initial public hearings in February, March and April, 1990, the Supervisor entered his Opinion and Order dated August 6, 1990. In that Order, the Supervisor provided for the formation of the NSPU subject to the terms, provisions and conditions set forth in the Order.

On October 22, 1990, after the service and publication of Notice, a Supplemental public hearing was held before the Supervisor to determine whether the percentage approvals required by 1959 PA 197, Section 7 have been obtained.

FINDINGS OF FACT

1. During the initial hearing for this matter, Marathon presented as Exhibit 28 a proposed Unit Agreement and as Exhibit 29 a proposed Unit Operating Agreement. The Supervisor adopted and approved these Agreements with certain changes. In paragraphs 10, 11 and 12 on

page 12 of the August 6, 1990 initial Opinion and Order, the Supervisor added language to Section 8.1 of the Unit Agreement and added new Sections 4.3.6 and 4.1.1 to the Unit Operating Agreement. At the Supplemental Hearing, Marathon presented as its Exhibit S-1 and S-2 a revised Unit Agreement and Unit Operating Agreement containing the additions required by the Supervisor in the August 6, 1990 order. The revised Unit Agreement and Unit Operating Agreement conform to the modifications contained in the Supervisor's Order dated August 6, 1990.

2. At the Supplemental hearing, Marathon presented testimony and Exhibits indicating that the revised Unit Agreement (Exhibit S-1) and revised Unit Operating Agreement (Exhibit S-2) have been approved in writing by such persons who, under the Supervisor's August 6, 1990 Order, will be entitled to at least 75% of all production from the Unit Area or proceeds thereof, and by such persons who will be entitled to at least 50% of the production from the Unit Area, or proceeds thereof, which will be credited to interests which are free of cost. Accordingly, Marathon has obtained sufficient ratifications to meet the requirements of Section 7 (b) of Act 197.

3. The revised Unit Agreement and Unit Operating Agreement should be approved and declared effective.

CONCLUSIONS OF LAW

1. The Petition and these proceedings before the Assistant Supervisor of Wells are governed by the "Michigan Unitization Law", 1959 PA 197, as amended, and 1939 PA 61, as amended.

2. Marathon Oil Company is a proper applicant for an order of unitization because it is a lessee in the Unit Area.

3. As previously detailed in the Findings of Fact in the August 6, 1990 Opinion and Order, the competent, material and substantial evidence in the record as a whole supports the conclusion that the application should be granted and meets the criteria of the "Michigan Unitization Law" and of 1939 PA 61.

4. As detailed in the Findings of Fact in this Supplemental Opinion and Order, the evidence supports the conclusion that Marathon has obtained the necessary approvals under Section 7 (b) of Act 197 so that a final Order can be entered approving the NSPU and declaring it effective.

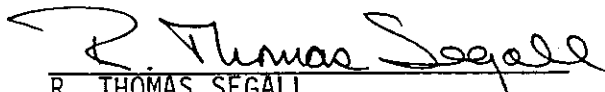
SUPPLEMENTAL DETERMINATION AND ORDER

NOW THEREFORE, based on the record for this proceeding, and after receiving the Advisory Board's recommendation to approve the unitization

IT IS ORDERED:

1. That the initial Order of the Assistant Supervisor of Wells, dated August 6, 1990, is hereby incorporated by reference.
2. That this Order shall be considered a supplemental order providing for unitized operations, pursuant to Section 8, of 1959 PA 197.
3. That the revised Unit Agreement (Exhibit S-1) and revised Unit Operating Agreement (Exhibit S-2), which together comprise the Plan for Unit Operations, are hereby declared and made effective, and unit operations shall commence as of 7:00 a.m. on November 1, 1990.

Dated: 10/23/90


R. THOMAS SEGALL
ASSISTANT SUPERVISOR OF WELLS

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

ORDER OF THE SUPERVISOR OF WELLS

IN THE MATTER OF

THE PETITION OF MARATHON OIL COMPANY)
FOR UNITIZATION OF PART OF THE)
STONEY POINT FIELD IN PARTS OF)
HANOVER TOWNSHIP, JACKSON COUNTY AND)
PARTS OF MOSCOW TOWNSHIP, HILLSDALE)
COUNTY AND ABROGATION OF SPACING AND)
PRORATION WITHIN THE UNIT AREA)

ORDER NO. (A) 1-1-90

OPINION AND ORDER

On January 5, 1990 a prehearing conference was held for this proceeding. Public evidentiary hearings were held before the Assistant Supervisor of Wells and Administrative Law Judge on February 12, 13, 27; March 21; April 3, 5, 6, 19, 20, 25, 1990. The hearings were conducted pursuant to 1939 PA 61, as amended, the promulgated rules, and 1959 PA 197, as amended. The purpose of the hearings was to consider the Verified Petition of Marathon Oil Company (Marathon) to form the North Stoney Point Unit (NSPU) pursuant to 1959 PA 197.

The Verified Petition sought an initial order providing for unitized operations, and requested the scheduling of a supplemental hearing pursuant to 1959 PA 197, Section 8 [MCL 319.358, MSA 13.139 (108)] for purposes of determining whether the approvals required by 1959 PA 197, Section 7 [MCL 319.357, MSA 13.139 (107)] have been obtained. Accordingly, this order is not a final decision or order, but is preliminary and contingent on the Supervisor's entry of a final order after a supplemental hearing has been held to make the findings required by 1959 PA 197, Section 7. The Assistant Supervisor of Wells has carefully reviewed the record. All of the contentions of the parties have been considered. Contentions of the parties not adopted in this Order are rejected as being contrary to the evidence.

FINDINGS OF FACT

1. The Stoney Point Field (Field) is a Trenton-Black River oil field trending northwest-southeast across portions of Jackson and Hillsdale Counties. The geographic extent of the spaced area was established in Order No. 4-4-84, as amended by Order No. (A) 12-3-85. Those orders established drilling units as 40 acres, set well location rules and established oil and gas proration allowables. The 1984 and 1985 orders were amended effective May 1, 1989 by Order No. 4-10-88. Order No. 4-10-88 was amended by Administrative Order dated May 10, 1989.

2. Marathon filed its Verified Petition dated November 15, 1989 requesting that the Supervisor of Wells form the NSPU pursuant to 1959 PA 197. The NSPU covers part of the Field. Marathon is the owner of working interests in lands within the NSPU.

3. The proposed unitized formation includes all geologic strata from the top of the Trenton Group to a depth one hundred (100) feet below the top of the Prairie du Chien Group within the NSPU area.

4. The proposed Unit Area is described as follows:

W 1/2 of NE 1/4, SE 1/4 of NW 1/4, NE 1/4 of SW 1/4, and SE 1/4 of Section 30; NE 1/4, NW 1/4 of SE 1/4, and E 1/2 of SE 1/4 of Section 31; SW 1/4 of NW 1/4, W 1/2 of SW 1/4, and SE 1/4 of SW 1/4 of Section 32, in T4S, R2W, Hanover Township, Jackson County, Michigan and SE 1/4 of NW 1/4, W 1/2 of NW 1/4, SW 1/4, and SW 1/4 of SE 1/4 of Section 5; E 1/2 of NE 1/4 of Section 6; E 1/2 of NW 1/4, W 1/2 of NE 1/4, SE 1/4 of NE 1/4, and SE 1/4 of Section 8; N 1/2 of NW 1/4 of Section 16; and N 1/2 of NE 1/4 of Section 17, in T5S, R2W, Moscow Township, Hillsdale County, Michigan

5. Marathon is the proposed unit operator, as set forth in Petitioner's Exhibit No. 29.

6. The Petition was protested by James A. Knight - Heat Controller, Patrick Petroleum, Jackhill Oil, John V. Martin and 24 royalty owners.

7. The Supervisor has had the benefit of a fully developed record consisting of over 100 exhibits and 1700 pages of transcript including the testimony of two geologists, five petroleum engineers and others knowledgeable about the Field. During the course of the proceedings there developed among the parties and witnesses a limited agreement on the following basic facts. Based on the record, the Supervisor makes the following findings of fact:

a) The Field and the NSPU area are synclinal in nature. Anticlinal structural closure does not exist in the Field. The Field is made up of heterogeneous and discontinuous reservoirs. Permeability, porosity, and reservoir quality change significantly over very short distances. The producing trend is linear, narrow and elongate in nature. Permeability barriers exist throughout the Field. The Field is noted for such isolated discontinuous productive zones. The reservoir rock is fractured. The great productivity of the Field is attributed to the presence of natural fractures and associated vugular or cavernous porosity. It is well established that drainage patterns are non-radial and that low permeability areas (barriers) prevent uniform and predictable drainage patterns. The reservoir contains dual porosity: one component related to fracture and vugular or cavernous features and the second component related to the matrix of the rock.

b) Separate and distinct porosity compartments occur in the Field that do not communicate or are poorly communicated with other porosity compartments and thus cannot be effectively or efficiently drained by one well per 40-acre unit. Accordingly, additional well-bores are needed to intersect this heterogeneous porosity and to adequately, effectively and efficiently drain the reservoir.

c) Bottom hole pressure studies in the NSPU unit area indicate the presence of at least three major pressure areas: the North Pressure Area, the Central Pressure Area and the South Central Pressure Area. The evidence indicates that other small or isolated pressure areas may exist in the Unit Area and that as development and production continues, the extent of the pressure areas may be re-defined and certain sub-pressure areas will be identified. Presently available data indicates the three major pressure areas are not in pressure communication.

d) On average, the North Pressure Area has been less productive of oil than are the Central and South Central Pressure Areas. However, the North Pressure Area contains some very productive wells and the Central and South Central Pressure Areas contain some marginal wells. The oil column thickness in wells in the North Pressure Area ranges from 60 to 140 feet whereas the height of the oil column in the Central and South Central Pressure Areas is approximately 200 feet. From a geological point of view, all pressure areas exhibit similar characteristics throughout.

e) All parties agreed that the feasibility of gas reinjection or some type of pressure maintenance should be evaluated. The Supervisor concurs in that opinion. Formation of the NSPU will facilitate the study of gas reinjection and will provide a location for a pilot program, if engineering studies indicate a pilot is justified.

f) The most important sources of the reservoir energy necessary to produce oil are solution gas drive and gas cap expansion.

g) There is uniformity of opinion that waste, as defined in Act 61 and Act 197, has been occurring in the NSPU area. Unit-wide gas and water production is increasing. Certain wells produce unacceptable amounts of gas and water as compared to the amount of oil recovered. In Order No. 4-10-88, the Supervisor reduced the gas allowable from 230 Mcf to 175 Mcf per day, for the entire Field. By the April 6, 1990 Temporary Proration Order, the Supervisor further reduced the gas allowable (for the NSPU area only) to 125 Mcf per day. The Temporary Proration Order was entered based on uncontroverted expert testimony that unless gas production in the NSPU is controlled, significant amounts of oil will be irretrievably lost. The testimony of Mr. Biernbaum, Mr. McLearn, Mr. Simon and Mr. Flinchum, all qualified reservoir or petroleum engineers, established that current methods of operating the NSPU Area are unnecessarily depleting the area of gas energy which is essential for moving oil to the well bore.

h) As found in Paragraph 7g) above, gas production in the NSPU must be controlled or significant amounts of oil will be irretrievably lost. The Supervisor finds further, that it is necessary to expand control of gas production in the NSPU to reduce the amounts of oil which will be irretrievably lost and to prevent waste. To this end, those oil wells operating at a sales GOR of 15,000:1 or greater and those wells which operate only for gas need be reduced further to a gas allowable per well of 62.5 Mcf per day. This reduction balances the correlative rights of the operators while reducing the waste through the inefficient dissipation of reservoir energy.

8. The proposed unit area is appropriate. Marathon defined the boundaries of the unit by determining which tracts have had oil or gas sales, and by review of pressure data. The East and West boundaries of the Unit were delineated by review of which 40-acre units have been productive, with the exception of the 40-acre units for the Warner 1-9 well and the Warner 2-9 well; although these wells were part of the proposed unit in the feasibility study of October 1989, they were not included in the present proposed unit. Because anticlinal structural closure does not exist in this Field, and there is little or no correlation of productive zones between wells, it is not possible to delineate the productive boundaries by any method other than whether oil or gas has actually been encountered in sufficient volume to justify sales. The evidence supports this method of delineating the East and West boundaries. The North boundary was determined somewhat differently. A number of dry holes separate the North Unit boundary from small productive areas to the North. Also, the small productive areas to the North have different pressure declines and depletion histories from the North Pressure Area. These differences support the conclusion that separation exists (Marathon Exhibits 30, 31). The South unit boundary was defined by review of pressure data. Marathon Exhibits 32, 33 and 34 establish that there is pressure separation between the South Central Pressure Area which is within the NSPU and the South Pressure Area, which is to the South of the NSPU. The differing pressure declines of these two areas support the conclusion that the areas are not in pressure communication, and thus unitization of the NSPU will have no positive or negative affect on the South Pressure Area.

The record indicates that formation of the NSPU will not affect the correlative rights of lands outside the Unit Area. Pressure separation to the North and South assures that such lands will not be affected by Unit operations. Presently there are no producing wells to the East or the West of the NSPU. However, due to the unusual nature of this reservoir, there is no complete assurance that in the future successful wells will not be drilled along the East and West flanks outside of the NSPU. If successful flank wells are drilled, they could potentially be in pressure communication with wells inside the NSPU. However, the evidence supports the conclusion that allowing such wells to produce subject to Order No. 4-10-88, as amended, and requiring wells within the unit to be no closer than 330 feet to the unit boundary, will sufficiently protect the correlative rights of those owners. Should pressure maintenance or secondary recovery become desirable, then a hearing will be required. Such hearing will provide for consideration of the potential impact of such operation on lands outside the unit area.

The evidence indicated that the areal extent of the South Pressure Area is still being defined by step-out drilling, and such drilling is likely to continue for some time. This is sufficient justification for excluding the South Pressure Area from the NSPU.

Productive portions of the Field underlie each tract making up the Unit Area. The evidence establishes that on a unit-wide basis, the requirements of Section 5(4) of Act 197 have been met.

9. The type of operations proposed by Marathon include the following: (i) reservoir energy conservation by shutting-in high Gas Oil Ratio (GOR) and high Water Oil Ratio (WOR) wells and by operating low GOR and WOR wells at their maximum efficient rates; (ii) development of additional reserves by drilling; (iii) consolidation of facilities; and (iv) the evaluation of secondary recovery to determine whether a gas re-injection program is feasible. Marathon has proposed that the NSPU shall initially be operated as a primary production unit. If a gas re-injection program is feasible and the unit operating committee desires to go forward, it will be necessary to obtain an order of the Supervisor before implementing the details of the program.

10. Marathon relied in part on reservoir modeling to predict the reaction of the reservoir to Marathon's proposed operations. Mr. George L. Lane testified as an expert in reservoir engineering and reservoir modeling, and discussed Marathon's use of the Eclipse Reservoir Model. The area modeled was the Central Pressure Area. The Eclipse Model can analyze a dual porosity and permeability reservoir, such as exists in this Field. Once the model is "history matched" or calibrated, it can predict reservoir performance. The results predicted by the reservoir model were compared with historic operations and recoveries in the analogous Albion Scipio Field. The comparison established that the recoveries predicted by the reservoir model are reasonable.

11. The geological characteristics of the NSPU area were reviewed by Marathon's Mr. Swager he reviewed all available logs, drilling, production and pressure reports, and publications. Mr. McLearn studied engineering data on a unit-wide basis. The data show the North, Central and South Central Pressure Areas are analogous.

Marathon's Eclipse reservoir model covered only the Central Pressure Area and was relied on, in part, to analyze the entire NSPU area reaction to Marathon's proposed operations. Knight - Heat Controller, argued that a localized study on the Central Pressure Area cannot be extrapolated to the North Pressure Area. The Supervisor declines to adopt that position. The North Pressure Area is less productive of oil, but Marathon's engineers took that fact into consideration in projecting expected incremental recoveries from the North Pressure Area. The data base is adequate to make a reasonable unit-wide extrapolation. These data show the feasibility of successful unit operations.

12. The formation of the NSPU is reasonably necessary to substantially increase the ultimate recovery of oil and gas from the NSPU area. Based on reservoir modeling and comparison to the analogous Albion Scipio Field, Marathon Exhibits 17 and 18 showed that for the model area, an incremental one million barrels of oil and 600 million cubic feet of gas will be recovered if the NSPU is formed in 1990. If unitization occurs in 1990, incremental reserves for the entire NSPU area were predicted to be 2,584,000 barrels of oil and 1,424,000,000 cubic feet of gas (Marathon Exhibit 24). These incremental recoveries represent a substantial amount of oil and gas. Marathon Exhibit 27 indicates that 44,000 barrels of oil will be lost for each month of delay in forming the NSPU. All evidence shows that GOR Management alone would substantially increase oil recovery.

13. The proposed unitized operations are feasible. The evidence indicates that high GOR and WOR wells can be shut in, other wells can be monitored and shut-in if they develop such problems in the future, development wells can be optimally located, surface facilities consolidated and gas reinjection studied. From an engineering and technical perspective, it is clearly feasible and practical to manage the NSPU area as a unit.

14. The petitioner estimated that incremental oil and gas of a value of \$28,000,000 could be recovered through the initiation of unitization. The estimated additional expenses and capital investment are \$9,200,000. Several of the protestants alleged Marathon overestimated potential recoveries and underestimated the additional costs. Jackhill Exhibits 8 and 9 are based on such allegations, however, they are not inconsistent with a finding that NSPU operations will likely yield additional production of greater value than the additional cost. I find that the incremental oil to be recovered is of greater value than the estimated additional cost of those operations.

15. The NSPU area is produced on 40-acre units. The Field is presently a competitive reservoir with each operator producing their wells so as to maximize production. Under unitization, the Unit Operating Committee can manage all wells in the best interests of the unit as a whole.

Mr. DeHaas, a geologist testifying on behalf of James Knight - Heat Controller, suggested that individual high GOR and/or high WOR wells should simply be shut-in or plugged. Mr. DeHaas' approach would have the Supervisor direct the shut-in of selected wells. The possibility of other methods to reduce or eliminate waste is not a reason to reject unitization.

16. Avoidable waste could occur in the NSPU area if the necessary development wells are not drilled. The Field and the NSPU area contain isolated discontinuous productive areas. Low permeability reservoir rock or barriers prevent drainage from such areas, and thus some 40-acre units cannot be effectively or efficiently drained by one well. In Order No. 4-10-88 the Supervisor recognized these reservoir characteristics and abrogated the half allowable restrictions for off-pattern well locations. The Supervisor is satisfied that additional well bores are necessary to adequately and efficiently drain the reservoir. If such wells are not drilled, oil present in such undrained areas may never be recovered.

Marathon's studies indicated that 25 development wells might be necessary to adequately drain the reservoir. Other parties disputed the number of wells necessary to adequately drain the NSPU area, suggested alternate locations, and a phased drilling program with the results of one phase analyzed before another is commenced. The number, location and the program for drilling development wells are operational questions to be worked out after commencement of NSPU operations. For purposes of forming the Unit, the evidence clearly supports the conclusion that significant amounts of incremental oil can be recovered through drilling of development wells. In a unitized field wells can be placed in optimum locations not constrained by the "hard lines" of individual 40-acre drilling units.

Knight - Heat Controller agreed that development wells are necessary, but argued that they should be drilled on a "two-per-40" basis. If drilling in hard line areas is necessary, a sub-330 foot location exception should be requested from the Supervisor. The "two-per-40" approach is rejected for the reasons expressed in Order No. 4-10-88. Among other things, unitization and abrogation of spacing eliminates the need for individual administrative proceedings to approve individual sub-330 foot locations. Again, the possibility of other ways to enhance production does not detract from unitization. The Supervisor finds that abrogation of spacing and proration within the unit area is necessary to implement unitization.

17. The Petitioner's Unit Agreement and Unit Operating Agreement constitute a plan of unit operations which contains all the required terms and conditions as set forth in 1959 PA 197, Section 6 [MCL 319.356; MSA 13.139(106)]. The Unit Agreement and Unit Operating Agreement are fair, reasonable and equitable. The Unit Operating Agreement provides that persons who elect not to pay their share of unit operations shall be carried by those persons who support unit operations. (Section 11.8 of Marathon Exhibit 29, the Unit Operating Agreement). Such a provision is typical of other Unit Operating Agreements previously approved by the Supervisor in connection with

many other unitizations. Knight - Heat Controller and Martin requested that the Unit Operating Agreement contain a so-called "non-consent" provision. Such a provision would cause interests in the unit to diverge. One of the advantages of unitization is the uniform concerted and cooperative management of the unit as a whole. A non-consent provision would be burdensome from an administrative point of view and, if included in the Unit Operating Agreement, might affect the feasibility of the proposed operations. Finally, Act 197 does not authorize the Supervisor to impose a penalty which recognizes the risk of the operation conducted, as would normally be included in a non-consent provision.

The Supervisor notes that the carrying provision of the Unit Operating Agreement is liberal (Marathon Exhibit 29, Section 11.8). If a working interest owner elects to be carried, it can limit its exposure for capital investments to 15% of its unit production. In such case, the parties proposing the operation can recover the carried person's share of such expenses from only 15% of the carried person's share of revenue. The Supervisor finds that to be fair and reasonable.

The Unit Operating Agreement contains many provisions which control actions by the Unit Operator and protect the interests of minority non-operators. Such provisions are contained in Articles 3, 4, 5, 6 and 7 of Marathon Exhibit 29.

Knight - Heat Controller complain the Unit Agreement and Unit Operating Agreement do not take into account private contractual rights contained in Knight - Heat Controller Exhibits 1 through 5. Section 18 of Act 197 expressly provides that private contracts can be amended as necessary to accomplish unitization. All parties' contract rights are adjusted to accommodate unitization, not just Knight - Heat Controller contract rights. The public's interest in preventing waste and enhancing production justifies necessary adjustments of contract rights to achieve the benefits of unitization. It is not the role of the Supervisor to determine if unitization is better or worse for participants, only to determine if it is fair and equitable. All contracts are subject to the reasonable exercise of the police power.

The Supervisor is of the opinion that the provisions of the Unit Agreement and Unit Operating Agreement should be adjusted with regard to certain minor administrative details of the unit. Such adjustments are set forth in the Determination and Order portion of this Order.

18. Correlative rights inside the NSPU will be protected because the tract participation formula (Marathon Exhibit 36) allocates to each separately owned tract a fair, reasonable and equitable share of unit production. The formula is an equal weighting of three parameters: current production (production from June 1, 1989 through November 30, 1989); cumulative production (total production through November 30, 1989); and remaining developed reserves (reserves calculated for each well using decline curve analysis). The first factor reflects current revenue. The second factor reflects the development potential of a tract, and the third factor assesses the future productive worth of an existing well. The formula was devised by the North Stoney Point Unit Committee, and an engineering sub-committee specifically formed to

determine the remaining developed reserves parameter. A number of other parameters were considered and rejected by the Committee. No other party proposed an alternate formula. Mr. DeHaas did recommend that net pay maps be used as one of the parameters, but no net pay maps or data were offered into evidence. The accuracy and usefulness of net pay maps is subject to question in such a heterogeneous reservoir, it is but one of many potential parameters that could have been included in a participation formula.

An objection was raised to the participation formula in that it uses a value ratio of 6 for each barrel of oil versus 1 for each Mcf of gas in its calculations. Since all values are converted on the basis of this ratio, it is important. The ratio is an industry standard required by the Securities and Exchange Commission in filings estimating oil and gas reserve values. Testimony was that it has general acceptance in the industry. The basis of the ratio is the equivalent BTU value of the products. Parties argue that the processing fees for gas in the NSPU cause the value of gas to be disproportionately low when compared to gas that does not require processing. Anyone associated with oil pricing over the last decade is well aware of the speculative nature of attempts to predict future prices. It is also a necessity to equate gas and oil values in the participation formula. The operation of the unit commingles the products, so they are inseparable of assignment on the basis of gas and oil to specific tracts. Two things favor the adoption of the 6 to 1 ratio. One factor is the general industry acceptance; it is a ratio with a history of use. The other factor is, the gas is the energy to produce the oil. It is the source of all value in the unit because it provides the means of production. On balance the ratio is fair and equitable. Over time market and political forces will cause oil and gas prices to fluctuate, it is impossible to predict the range of those fluctuations.

The tract participation factors calculated by using the three parameter formula are set forth in Marathon Exhibit 35. No other party proposed alternate tract participation factors.

Knight - Heat Controller argued that the North Pressure Area should be removed from the NSPU on the basis that it diluted the interests of the owners in the Central and South Central Pressure Areas. The Supervisor rejects this position because the record does not indicate dilution has occurred. The Tract Factors allocate a total of 37.77% of unit production to the 23 Tracts constituting the North Pressure Area, and a combined total of 62.233% of unit production to the 19 tracts constituting the Central and South Central Pressure Areas. The record shows a fair share of unit production has been allocated to each separate pressure area and to each individual tract.

Furthermore, the Supervisor finds that the inclusion of the three pressure areas into one unit will increase the benefits of unitization by increasing the amount of acreage available for drilling, reducing administrative costs, allowing the consolidation of facilities and by eliminating concerns about the location and number of pressure areas and possible leakage between them.

It is the finding of the Supervisor of Wells that the tract percent participation factors reasonably allocate to each tract its fair share of unit production. The factors are fair, reasonable and equitable. There is no indication a more equitable formula could be devised. The factual issue to be decided is, whether the proposed formula is fair and equitable. As in all unitizations there are innumerable combinations of criteria that might be employed. Experience demonstrates there is no perfect formula. This is because the predictive science is not perfect, thus there are no perfect formulas. The Act requires a percentage of approval, thus a formula which is acceptable to the majority of all interests is required.

CONCLUSIONS OF LAW

1. The Petition and these proceedings before the Assistant Supervisor of Wells are governed by the "Michigan Unitization Law", 1959 PA 197, as amended, and 1939 PA 61, as amended.
2. Marathon Oil Company is a proper applicant for an order of unitization because it is a lessee in the Unit Area.
3. As previously detailed in the Findings of Fact, the competent, material and substantial evidence in the record as a whole supports the conclusion that the application should be granted and meets the criteria of the "Michigan Unitization Law" and of 1939 PA 61.
4. As previously detailed in the Findings of Fact, abrogation of spacing and proration, as established by prior orders, is necessary to implement unitized operations.
5. The Supervisor of Wells has jurisdiction of the subject matter and the persons interested therein; due notice of the time, place and purpose of the hearings were given as required by law and all interested parties were afforded an opportunity to be heard.
6. Act 197 does not require that the necessary findings as set forth in Section 5(4) of the Act be made on a tract-by-tract basis. The evidence need only support the conclusion that the requirements of Section 5(4) will be met by operation of the unit as a whole. Further, the Supervisor has found that the methodology employed has properly assigned participation factors based on the relative value of the tracts one to another.

DETERMINATION AND ORDER

Now, therefore, based on the entire record in this proceeding, and following consultation with the Advisory Board and consideration of its recommendations, it is Ordered:

1. Subject to entry of a Final Order pursuant to 1959 PA 197; Section 8, establishing that the approvals as required by Section 7 have been acquired, the North Stoney Point Unit is hereby created in accordance with, and subject to, the terms, provisions and conditions of this Order and the plan of unit operations consisting of the Unit Agreement (Marathon Exhibit No. 28) and Unit Operating Agreement (Marathon Exhibit No. 29) which are incorporated herein by reference.

Unit operations, as set forth in paragraph 10 of the Findings of Fact, shall not commence, and this Order shall not be effective until entry of a Supplemental Order under 1959 PA 197, Section 7, finding that the necessary ratifications have been obtained.

2. The North Stoney Point Unit shall be operated exclusive of, and as an exception to all of the provisions of Order No. 4-10-88, as amended, Order No. 4-4-84, as amended, R 299.1201 and R 299.1202, provided, that no well bore shall be completed on the Unit Area closer than 330 feet from the unit boundary.

3. From the date of this order, until the commencement of unit operations as provided in Paragraph 1 above, the oil wells operating at a sales GOR of 15,000:1 or greater and the wells which operate only for gas, shall be reduced to a gas allowable of 62.5 Mcfg per day.

4. The Unitized Formation shall include all geologic strata from the top of the Trenton Group to a depth one hundred (100) feet below the top of the Prairie du Chien Group within the Unit Area.

5. The Unit Area is described as:

W 1/2 of NE 1/4, SE 1/4 of NW 1/4, NE 1/4 of SW 1/4, and SE 1/4 of Section 30; NE 1/4, NW 1/4 of SE 1/4, and E 1/2 of SE 1/4 of Section 31; SW 1/4 of NW 1/4, W 1/2 of SW 1/4, and SE 1/4 of SW 1/4 of Section 32, in T4S, R2W, Hanover Township, Jackson County, Michigan and SE 1/4 of NW 1/4, W 1/2 of NW 1/4, SW 1/4, and SW 1/4 of SE 1/4 of Section 5; E 1/2 of NE 1/4 of Section 6; E 1/2 of NW 1/4, W 1/2 of NE 1/4, SE 1/4 of NE 1/4, and SE 1/4 of Section 8; N 1/2 of NW 1/4 of Section 16; and N 1/2 of NE 1/4 of Section 17, in T5S, R2W, Moscow Township, Hillsdale County, Michigan

6. Each tract within the Unit Area shall participate in the unit production and other benefits, and shall bear the burdens of unit expense in accordance with the Unit Agreement and Unit Operating Agreement.

7. This order shall remain effective for a period of six (6) months after the date hereof unless its effectiveness is extended as provided for in 1959 PA 197, Section 8.

8. The Unit Operator shall make written reports to the Supervisor of wells on a quarterly basis. Such reports shall include the oil, gas and water production rates on a per well and on a Unit wide basis, and any pressure data collected during the quarter. Royalty owners may review such data by visiting the Lansing offices of the Geological Survey Division, or by requesting a copy from the Unit Operator. The Unit Operator shall provide a copy upon request.

9. The Unit Operator shall not institute any type of gas reinjection or pressure maintenance program which involves injecting any substance into the formation without first receiving authorization from the Supervisor of Wells.

10. The following sentence shall be considered added to Section 8.1 of the Unit Agreement:

"No processing fee shall be charged to Royalty Owners on Unitized Substances injected into the Unitized Formation."

11. A new Section 4.3.6 shall be considered added to the Unit Operating Agreement:

4.3.6 Assignment to an Affiliate

On and after November 15, 1989, if one of the ten (10) largest Working Interest Owners assigns part but not all of its Working Interest to one or more affiliates, that Working Interest Owner and such affiliates shall only have the right to collectively appoint one (1) representative to the Unit Operating Committee. For purposes of this Section 4.3.6, an affiliate is an entity which: a) the Working Interest Owner owns; b) owns the Working Interest Owner; c) is owned by an entity which owns the Working Interest Owner; d) is an entity which is owned by a person listed below; or, e) is the spouse, lineal ascendant or descendant, or spouse of a lineal ascendant or descendant of the Working Interest Owner. Ownership under this Section 4.3.6 shall mean the direct or indirect, legal or beneficial, ownership of fifty percent (50%) or more of an entity.

12. A new Section 4.1.1 shall be considered added to the Unit Operating Agreement:

"4.1.1 Appointment of a Representative of the Royalty
Owners

Any group of royalty owners who have royalty ownership of more than 50% of the Unit royalty may collectively appoint one (1) representative to the Unit operating committee. Such representative shall have voice but not vote. Such royalty owner group shall inform Unit operator in writing of the names and addresses of the representative and alternate who are authorized to represent such royalty owners with respect to Unit operations. The representative or alternate may be changed by written notice to Unit operator."

13. The Supervisor of Wells retains continuing jurisdiction over the North Stoney Point Unit.

Dated: _____

8/6/90


R. THOMAS SEGALL
ASSISTANT SUPERVISOR OF WELLS

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

SUPERVISOR OF WELLS

In the Matter of:

The Petition of Marathon Oil)
Company for Unitization of)
Part of the Stoney Point Field) Cause No. (A) 1-1-90

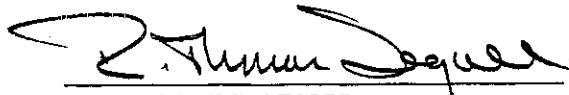
ORDER QUASHING SUBPOENA

This matter is before the Supervisor on the Motion of Marathon Oil Company to Quash a Subpoena dated April 6, 1990 issued to Robert Biernbaum. The Supervisor reaches this opinion based on the files and records of this case. The Subpoena is Quashed for the following reasons.

1. The proof of service shows no witness fees or mileage paid as required by MCL 24.273, MCL 319.387 and MCL 319.9.
2. The Subpoena was mistakenly issued in that the filing of a written request for issuance must precede issuance MCL 24.273, R 299.2008(1).

Now, therefore, the Subpoena duces tecum for Robert Biernbaum is quashed.

Dated: 4/16/90


R. THOMAS SEGALL
ASSISTANT SUPERVISOR OF WELLS

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

SUPERVISOR OF WELLS

In the Matter of:

The Petition of Marathon Oil)
Company for Unitization of)
Part of the Stoney Point Field)

Cause No. (A) 1-1-90

ORDER CONDITIONING SUBPOENA

This matter is before the Supervisor on the Motion of Marathon Oil Company for Costs and Limiting Examination for a Subpoena dated April 12, 1990 issued to Fred Adams. The Supervisor reaches this opinion based on the files and records of this case. The Subpoena is Conditioned for the following reasons.

1. The respondent to the Subpoena, Marathon Oil Company, asserts the material sought, depending on the form requested, could involve considerable expense.

2. The party who sought the Subpoena had possession of all of Marathon's proposed exhibits for several months and chose to wait until after the Petitioner's case was closed to seek production.

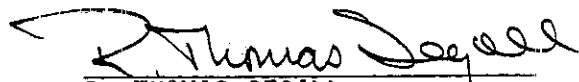
Now, therefore, it is ordered that

1. The production of materials requested in the April 12, 1990 Subpoena to Fred Adams is conditioned upon paying the reasonable cost of production.

2. The request to limit examination is denied as premature.

Dated:

4/17/90


R. THOMAS SEGALL
ASSISTANT SUPERVISOR OF WELLS

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

SUPERVISOR OF WELLS

In the Matter of:

The Petition of Marathon Oil)
Company for Unitization of)
Part of the Stoney Point Field)

Cause No. (A) 1-1-90

ORDER QUASHING SUBPOENA

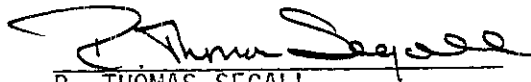
This matter is before the Supervisor on the Motion of Marathon Oil Company to Quash a Subpoena dated April 12, 1990 issued to Robert Biernbaum. The Supervisor reaches this opinion based on the files and records of this case. The Subpoena is Quashed for the following reasons.

1. The proof of service shows no witness fees or mileage paid as required by MCL 24.273, MCL 319.387 and MCL 319.9.

2. The Subpoena was mistakenly issued in that the filing of a written request for issuance must precede issuance MCL 24.273, R 299.2008(1).

Now, therefore, the Subpoena duces tecum for Robert Biernbaum is quashed.

Dated: 4/17/90


R. THOMAS SEGALL
ASSISTANT SUPERVISOR OF WELLS

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
SUPERVISOR OF WELLS

IN THE MATTER OF

THE PETITION OF MARATHON OIL COMPANY)
FOR UNITIZATION OF PART OF THE)
STONEY POINT FIELD IN PARTS OF)
HANOVER TOWNSHIP, JACKSON COUNTY AND)
PARTS OF MOSCOW TOWNSHIP, HILLSDALE)
COUNTY AND ABROGATION OF SPACING AND)
PRORATION WITHIN THE UNIT AREA)

CAUSE NO. (A) 1-1-90

NOTICE OF SUPPLEMENTAL HEARING

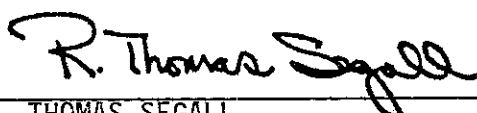
Take notice that a public hearing will be held before the Supervisor of Wells in the City of Lansing, Michigan, on the TWENTY-SECOND DAY OF OCTOBER (OCT. 22) 1990, BEGINNING AT 10:00 A.M. EASTERN DAYLIGHT SAVING TIME, IN THE DELTA TOWNSHIP ADMINISTRATION BUILDING, WEST SAGINAW HIGHWAY, WEST SAGINAW AT I-96 BETWEEN LANSING AND GRAND LEDGE, MICHIGAN. The hearing will be conducted pursuant to Act 197, Public Acts of 1959, as amended.

Marathon Oil Company, P.O. Box 277, Bridgeport, Illinois 62417 has filed a motion with the Supervisor for a supplemental hearing pursuant to Section 8 of 1959 PA 197 and requests a supplemental order of the Supervisor declaring the plan for unit operations effective. The Supervisor has approved the plan for unit operations by Order No. (A) 1-1-90.

The purpose of the supplemental hearing is to determine whether Petitioner has attained the necessary percentage of approval of interests as required by Section 7 of 1959 PA 197.

A representative of Petitioner available to discuss this matter is Mr. Dan Koehling at Petitioner's address, telephone number (618) 544-2121.

Dated: September 18, 1990



R. THOMAS SEGALL
ASSISTANT SUPERVISOR OF WELLS

Questions regarding this notice may be directed to Gordon L. Lewis, Geological Survey Division, Department of Natural Resources, Box 30028, Lansing, Michigan 48909 (PH 517-334-6951).